Genotoxic Effects Of Zinc Oxide Nanoparticles

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In Vitro Toxicity Assays for Small Molecule Development *Everything Matters | Titanium | Ron Hipschman and Dr. Stuart Goodman | Exploratorium Dr. David Sinclair on Informational Theory of Aging, Nicotinamide Mononucleotide, Resveratrol*

|u0026 More Mod-01 Lec-01 Lecture-01-Introduction to Biomaterials **Genotoxic Effects Of Zinc Oxide**

In summary, genotoxic and cytotoxic effects of ZnO-NP to hMSC were demonstrated in long-term and repetitive exposure. A protective effect was seen after one week of MSC differentiation into osteogenic and adipogenic lineages. Observations over a total of six weeks indicate a persisting intracellular accumulation of ZnO-NP and an ongoing toxic effect.

Time-Dependent Toxic and Genotoxic Effects of Zinc Oxide ...

Here we have reported cytogenetic and genotoxic effects of ZnO NPs on the root cells of A. cepa. The effects of ZnO NPs on the mitotic index (MI), micronuclei index (MN index), chromosomal aberration index, and lipid peroxidation were determined through

the hydroponic culturing of A. cepa. A. cepa roots were treated with the dispersions of ZnO NPs at four different concentrations (25, 50, 75, and 100 μg ml (-1)).

Cytogenetic and genotoxic effects of zinc oxide ...

Genotoxic effects of Zinc oxide nanoparticles. April 2015; Nanoscale 7(19) DOI: 10.1039/C5NR01167A. ... Zinc oxide (ZnO) quantum dot (QD) is a promising inexpensive inorganic nanomaterials, of ...

(PDF) Genotoxic effects of Zinc oxide nanoparticles

Nanoparticular zinc oxide (ZnO) may be internalised through ambient air or the topical application of cosmetics, only to name a few, with unpredictable health effects. Therefore, we analysed the

determinants of ZnO nanoparticle (NP) genotoxicity.

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Genotoxic effects of zinc oxide nanoparticles - Nanoscale ...

The adsorption of dissolved zinc ions onto TiO 2-NPs is discussed as the major antagonistic mechanism. The combination of both metal oxide nanoparticles interferes with the genotoxicity of ZnO-NPs and should be discussed as a reasonable and safe alternative to the sole use of ZnO-NPs in consumer products.

Genotoxic effects of zinc oxide nanoparticles in nasal ...
The results of the study indicated cytotoxic effects of ZnO-NP beginning at high concentrations of 50 µg/mL and genotoxic effects in hMSC exposed to 1 and 10 µg/mL ZnO-NP. Repetitive exposure enhanced cyto- but not genotoxicity. Intracellular NP accumulation was observed up to 6 weeks. The results suggest cytotoxic and genotoxic potential of ZnO-NP.

Time-Dependent Toxic and Genotoxic Effects of Zinc Oxide ...
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Cytogenetic and genotoxic effects of zinc oxide ...

Other cellular responses may be induced and give rise to genotoxicity, such as oxidative stress induction, inflammatory response, and aberrant signaling responses (Figure 3).1,35,97Moreover, putative mechanisms underlying the detrimental effects of ZnO and silica NPs are proposed (Figure 4). Figure 3.

Current investigations into the genotoxicity of zinc oxide ...

To our knowledge, this is the first study evaluating toxic properties

of ZnO-NPs in human nasal mucosa cells. Beside cyto- and genotoxic effects, a dose-dependent release of pro-inflammatory IL-8 could be demonstrated. Our results suggest that ZnO-NPs are capable to induce DNA damage and inflammation even in low concentrations.

Cytotoxic, genotoxic and pro-inflammatory effects of zinc ...

Genotoxic effects of zinc oxide and titanium dioxide nanoparticles on root meristem cells of Allium cepa by comet assay E ş ref DEM İ R, Nuray KAYA*, B ü lent KAYA Department of Biology, Faculty of Sciences, Akdeniz University, Antalya, Turkey * Correspondence: nkaya@akdeniz.edu.tr 1. Introduction Industrial applications of nanotechnology are rapidly

Genotoxic effects of zinc oxide and titanium dioxide ...

The overall data suggest that the potential genotoxicity of ZnONP in Drosophila can be considered weak according to the lack of mutagenic and recombinogenic effects and the induction of primary DNA damage only at high toxic doses of ZnONP.

Genotoxic and oxidative stress potential of nanosized and ...

In this study, possible genotoxic effects of zinc oxide (ZnO) nanoparticles were investigated in cultured human peripheral lymphocytes by using chromosome aberrations and micronucleus assays (MN). For this purpose, the cells were treated with ZnO (1, 2, 5, 10, 15 and 20 μg/mL) for 24 and 48 h. In this research, four types of chromosome aberrations were observed as chromatid and chromosome breaks, fragment and dicentric chromosomes.

In vitro genotoxic effects of ZnO nanomaterials in human ...
Zinc-Oxide Nanoparticles Exhibit Genotoxic, Clastogenic, Cytotoxic and Actin Depolymerization Effects by Inducing Oxidative Stress Responses in Macrophages and Adult Mice Rashmirekha Pati , Rashmirekha Pati

Zinc-Oxide Nanoparticles Exhibit Genotoxic, Clastogenic ...
Genotoxic effects of zinc oxide and titanium dioxide nanoparticles on root meristem cells of Allium cepa by comet assay E ş ref DEM İ R, Nuray KAYA*, B ü lent KAYA Department of Biology, Faculty of Sciences, Akdeniz University, Antalya, Turkey * Correspondence: nkaya@akdenizedutr 1 Introduction Industrial applications of nanotechnology are rapidly ...

[EPUB] Genotoxic Effects Of Zinc Oxide Nanoparticles
Zinc oxide (ZnO) NPs are being used worldwide in consumer products and industrial applications. Based on predefined pathways, this study synthesized and characterized the nanostructures of ZnO NPs. The genotoxic effects of these nanomaterials were evaluated using a short-term in vivo bioassay, the somatic mutation and recombination test (SMART) in Drosophila melanogaster .

Genotoxicity of zinc oxide nanoparticles: an in vivo and ...
Bai et al revealed mitochondrial dysfunction leading to an increased ROS generation and consecutive DNA damage and cell death. 53 Another study indicated a stimulation of ROS production via the upregulation of lipoxygenases in neuroblastoma cells. 54 It has been

suggested that the dissolution of ZnO NPs into Zn 2+ ions and consecutive ROS generation after incorporation may be responsible for the genotoxic effects. 50,55 This seems to be all the more likely since zinc serves as a component of ...

[Full text] Effects of Zinc Oxide Nanoparticles in HUVEC ...

(2006) Clastogenicity, photo-clastogenicity or pseudo-photo-clastogenicity: genotoxic effects of zinc oxide in the dark, in pre-irradiated or simultaneously irradiated Chinese hamster ovary cells. Mutation Research/Genetic Toxicology and Environmental Mutagenesis 607(2): 215 – 224 .

This edited book, Toxicology - New Aspects to This Scientific Conundrum, is intended to provide an overview on the different xenobiotics employed every day in our anthropogenic activities. We hope that this book will continue to meet the expectations and needs of all interested in the implications for the living species of known and new toxicants and to guide them in the future investigations.

An overview of nanotechnology and its potential The field of nanotechnology is undergoing rapid developments on many fronts. This reference provides a comprehensive review of various nanotechnologies with a view to their biomedical applications. With chapters contributed by distinguished scientists from diverse disciplines, Biomedical Applications of Nanotechnology : Reviews recent advances in the designing of various nanotechnologies based

on nucleic acids, polymers, biomaterials, and metals Discusses biomedical nanotechnology in areas such as drug and gene delivery Covers advanced aspects of imaging and diagnostics Includes a chapter on the issue of nanotoxicology Complete with figures and tables, this is a practical, hands-on reference book for researchers in pharmaceutical and biotech industries, biomedical engineers, pharmaceutical scientists, pharmacologists, and materials scientists as well as for the policymakers who need to understand the potential of nanotechnology. It is also an excellent resource book for graduate-level students in pharmaceutical sciences, biomedical engineering, and other fields in which nanotechnology is playing an increasingly important role.

Ever increasing applications of nanomaterials (materials with one or

more dimensionless than 100 nm) has raised awareness of their potential genotoxicity. They have unique physico-chemical properties and so could have unpredictable effects. Zinc oxide(ZnO) and titanium dioxide (TiO2) are widely used in a number of commercial products. There are published studies indicating that some forms of these compounds may be photo-clastogenic in mammalian cells. What has not been investigated before is the effect of nanoparticles from these compounds in human germ cells. Thus the present study has examined their effects in the presence and absence of UV light in human sperm and compared responses to those obtained with human lymphocytes using the Comet assay to measure DNA damage. The effect of nanoparticles (40-70nm range) was studied in human sperm and lymphocytes in the dark, after pre-irradiation with UV and simultaneous irradiation with UV. The

studies do provide some evidence that there are photo-genotoxic events in sperm and lymphocytes in the absence of overt toxicity. The cytotoxic and genotoxic potentials of ZnO and TiO2 as well as their effect on phosphotyrosine expression, were examined in the human epithelial cervical carcinoma cells (Hela cells). This was done to try and determine the underlying molecular events resulting from their exposure to ZnO and TiO2 nanoparticles occurring at the same time as DNA is damaged. Concentration- and time-dependent cytotoxicity, and an increase in DNA and cytogenetic damage with increasing nanoparticle concentrations were reported in this study. Mainly for zinc oxide, genotoxicity was clearly associated with an increase in tyrosine phosphorylation. Nanotechnology has raced ahead of nanotoxicology and little is known of the effects of nanoparticles in human systems, let alone in

diseased individuals. Therefore, the effects of TiO2 nanoparticles in peripheral blood lymphocytes from patients with respiratory diseases (lung cancer, chronic obstructive pulmonary disease (COPD) and asthma) were compared with those in healthy individuals using genotoxic end points to determine whether there are any differences in sensitivity to nano-chemical insult between the patient and control groups. The results have shown concentration dependent genotoxic effects of TiO2 in both respiratory patient and control groups in the Comet assay and an increasing pattern of cytogenetic damage measured in the micronucleus assay without being statistically significant except when compared with the untreated controls of healthy individuals. Furthermore, modulation of ras p21 expression was investigated. Regardless of TiO2 treatment, only lung cancer and COPD

patients expressed measurable ras p21 levels that showed modulation as the result of nanoparticle treatment. Results have suggested that both ZnO and TiO2 nanoparticles can be genotoxic over a range of concentrations without either photo-activation or being cytotoxic.

This book is a printed edition of the Special Issue "Zinc Oxide Nanostructures: Synthesis and Characterization" that was published in Materials

This book discusses the latest developments in plant-mediated fabrication of metal and metal-oxide nanoparticles, and their characterization by using a variety of modern techniques. It explores in detail the application of nanoparticles in drug delivery,

cancer treatment, catalysis, and as antimicrobial agent, antioxidant and the promoter of plant production and protection. Application of these nanoparticles in plant systems has started only recently and information is still scanty about their possible effects on plant growth and development. Accumulation and translocation of nanoparticles in plants, and the consequent growth response and stress modulation are not well understood. Plants exposed to these particles exhibit both positive and negative effects, depending on the concentration, size, and shape of the nanoparticles. The impact on plant growth and yield is often positive at lower concentrations and negative at higher ones. Exposure to some nanoparticles may improve the free-radical scavenging potential and antioxidant enzymatic activities in plants and alter the micro-RNAs expression that regulate the different morphological, physiological and

metabolic processes in plant system, leading to improved plant growth and yields. The nanoparticles also carry out genetic reforms by efficient transfer of DNA or complete plastid genome into the respective plant genome due to their miniscule size and improved site-specific penetration. Moreover, controlled application of nanomaterials in the form of nanofertilizer offers a more synchronized nutrient fluidity with the uptake by the plant exposed, ensuring an increased nutrient availability. This book addresses these issues and many more. It covers fabrication of different/specific nanomaterials and their wide-range application in agriculture sector, encompassing the controlled release of nutrients, nutrient-use efficiency, genetic exchange, production of secondary metabolites, defense mechanisms, and the growth and productivity of plants exposed to different manufactured nanomaterials. The role

of nanofertilizers and nano-biosensors for improving plant production and protection and the possible toxicities caused by certain nanomaterials, the aspects that are little explored by now, have also been generously elucidated.

In this book leading drosophilists describe, in step-by-step detail, all the essential techniques for studying Drosophila chromosomes and suggest new avenues for scientific exploration. It provides a comprehensive cytogenetics laboratory manual for investigatiors, one suitable not only for novices, but also highly informative for seasoned investigators.

Exploration of fundamentals of x-ray diffraction theory using Fourier transforms applies general results to various atomic

structures, amorphous bodies, crystals, and imperfect crystals. 154 illustrations. 1963 edition.

With an in-depth exploration of the following topics, this book covers the broad uses of zinc oxide within the fields of materials science and engineering: - Recent advances in bulk, thin film and nanowire growth of ZnO (including MBE, MOCVD and PLD), - The characterization of the resulting material (including the related ternary systems ZgMgO and ZnCdO), - Improvements in device processing modules (including ion implantation for doping and isolation, Ohmic and Schottky contacts, wet and dry etching), - The role of impurities and defects on materials properties - Applications of ZnO in UV light emitters/detectors, gas, biological and chemical-sensing, transparent electronics, spintronics and thin film

This Special Issue presents studies on the genotoxicity of nanomaterials. Although nanomaterials provide multiple benefits in a wide range of applications, challenges remain in addressing strong concerns about their risks to the environment and human health. As a result of inconsistencies among published results and diverging conclusions, the understanding of nanomaterial exposure and toxicity remains unclear. Determining whether these materials cause DNA damage—the first step in carcinogenesis—must be a priority in testing. In this book, readers will find recent publications on the genotoxic response to a broad range of nanomaterials, the impact of physico-chemical characteristics, safe-by-design and new

developed tools.